Attachment 5: Work Plan

Project 1 – Construction of Three Monitoring Wells in the Arlington Groundwater Basin – Riverside County, California

Task 1 – Coordination, Planning and Permits

Subtask 1.1 – Project Coordination and Progress Reporting

During the course of the well design and construction work, Western go through a competitive bidding process to contract for a project manager to ensure that the project proceeds efficiently and contractual obligations of the drilling contractor are met per the technical specifications and associated contract documents. This work will include meetings or conference calls with the drilling contractor during drilling and well construction to check project progress against the schedule, troubleshoot issues that may arise during the well construction process, track the budget, and address requests for changes to the technical specifications. Daily reports from the onsite inspector will be reviewed on a weekly basis as well as monthly contractor invoices to ensure compliance with the technical specifications and bid items. The Project Manager will provide weekly email updates to Western on project progress. The budget for this task includes two progress meetings at Western in Riverside and two conference calls.

Subtask 1.2 – Preliminary Well Designs and Site Layouts

Prior to developing the detailed technical specifications (i.e. work plan) for drilling the wells, it will be necessary to confirm the location and configuration of the well sites and develop preliminary site layouts and design plans for environmental documentation and acquiring the appropriate permits. Preliminary site plans will be developed for each of the three monitoring well sites identified. The site plans will include the proposed locations for the wells, proposed drilling rig layout and work area, ingress and egress locations, and water discharge locations, as necessary. As part of this work, one site visit is budgeted to confirm the feasibility of each site layout.

This subtask will also include the development of conceptual well construction diagrams for each well, including the proposed wellhead completion details. The proposed site layouts and well construction diagrams will be necessary for the RCFCCD encroachment permit, as the proposed sites are located on their right-of-way.

Subtask 1.3 – Environmental Compliance

All site investigation work will be conducted in accordance with California Environmental Quality Act (CEQA) guidelines. For planning purposes, it is assumed that the environmental process will involve an Initial Study with the objective of having a negative declaration with mitigation measures. To ensure adequate substantiation of a negative declaration, the following studies will be conducted:

- Air quality assessment.
- Biological studies.
- Cultural resources studies.

No other technical studies are assumed necessary to substantiate the finding of negative declaration with mitigation measures. The estimated duration to complete this task is approximately three months (12 weeks).

Subtask 1.4 – Support to Acquire Encroachment Permits and Well Permits
Subtask 1.5 – Riverside County Flood Control District Encroachment Permits (Three Sites)
Subtask 1.6 – Riverside County Community Health Agency Department of Environmental Health Well Permit (Three Sites)

It will be necessary to obtain two permits for drilling, constructing and long-term monitoring of the wells:

1. An encroachment permit from Riverside County Flood Control and Conservation District (RCFCCD).
2. Well permits from the Riverside County Community Health Agency (RCCHA).

The RCFCCD has indicated, through preliminary discussions, that the monitoring wells can be located on their land as long as Western acquires the requisite encroachment permit. To obtain the RCFCCD encroachment permit, it will be necessary to submit an application along with the proposed site layouts and conceptual design drawings for the wells. Following RCFCCD review, it may be necessary to modify the site layouts and/or well designs in order to finalize the permit. Planning-level costs to obtain the permit, including RCFCCD fees, are shown in attachment 6.

The second permit will be the well construction permit, to be obtained from the RCCHA. The costs for this permit (one for each well) are also shown in attachment 6.

Based on the limited amount of groundwater that is anticipated to be developed during the well construction process, it is proposed to contain and dispose offsite of all well development water. As such, a National Pollutant Discharge Elimination System (NPDES) permit is not anticipated to be necessary.

Task 2 – Monitoring Well Installation

Subtask 2.1 – Field Inspections for the Drilling and Construction of Three Monitoring Wells

The borehole for each well is assumed to be drilled to a depth of 75 ft bgs and completed as a 4-inch diameter PVC monitoring well. A planning-level contractor cost estimate to drill and construct the monitoring wells, based on the hollow-stem auger drilling method, is provided in Table 1. Soil samples will be collected every 10-ft during drilling and logged in the field in accordance with the Unified Soil Classification System (USCS). All soil logging and well construction work will be conducted under the supervision of a California Registered Professional Geologist.

All field activities will be recorded on established field forms for later reference.

Subtask 2.2 – Inspection during Well Development

Well development would include initial development by bailing and swabbing and final development by pumping. During the well development process, a hydrogeologist will monitor groundwater quality

parameters (electrical conductivity, pH, temperature and turbidity) and ensure that the discharge is relatively free and clear of suspended sediment prior to completion. Groundwater levels will be measured during all phases of well development to determine both static and pumping groundwater levels in the wells. All field activities will be recorded on established field forms for later reference.

Subtask 2.3 – Drilling Monitoring Wells

The monitoring well construction process will be closely inspected to ensure it meets the requirements of California Department of Water Resources (CDWR) Bulletin 74-81 and 74-90 Well Standards. Well casing and filter pack will be inspected to ensure it meets the requirements of the final monitoring well design. During installation, onsite inspection will ensure that the well is constructed to the specified depths and with the specified screened intervals. Filter pack and seal installation will be inspected to ensure that the drilling contractor adheres to the depths and intervals specified.

Task 3 – Monitoring Well Construction Summary Report

Upon completion of the well construction work, a summary report will be prepared that describes the results of borehole drilling and monitoring well construction. The report will include:

- A description of the purpose for the wells.
- A description of the scope and conduct of work.
- A description of the methods and procedures used to collect the data.
- Detailed borehole lithologic logs for each well.
- As-Built diagrams for each monitoring well including the wellhead detail.
- Appendices of field notes and a photographic log of the boreholes.
- An appendix with field water quality data and development notes.

Figures will be provided showing the location of the monitoring wells and detailed site layouts.

A copy of the well construction summary report, including electronic groundwater level data collected during the well construction and development process, will be submitted to the CDWR upon completion.

Project 2 – Recharge Pilot Testing at Gibson Basin – Riverside County, California

Task 1 – Coordination, Planning and Permits

Subtask 1.1 – Project Coordination and Progress Reporting

During the course of the recharge pilot testing work Western go through a competitive bidding process to contract for a project manager to ensure that the project proceeds efficiently and contractual obligations of the various contractors are met per the technical specifications and associated contract documents. This work will include meetings or conference calls with the contractors constructing the basin to check project progress against the schedule, troubleshoot issues that may arise during the construction process, track the budget, and address requests for changes to the technical specifications. Daily reports from the onsite inspector will be reviewed on a weekly basis as well as monthly contractor

invoices to ensure compliance with the technical specifications and bid items. The Project Manager will provide weekly email updates to Western on project progress. The budget for this task includes two progress meetings at Western in Riverside and two conference calls.

Subtask 1.2 – Environmental Compliance

All site investigation work will be conducted in accordance with California Environmental Quality Act (CEQA) guidelines. For planning purposes, it is assumed that the environmental process will involve an Initial Study with the objective of having a negative declaration with mitigation measures. To ensure adequate substantiation of a negative declaration, the following studies will be conducted:

- Air quality assessment.
- Biological studies.
- Cultural resources studies.

No other technical studies are assumed necessary to substantiate the finding of negative declaration with mitigation measures. The estimated duration to complete this task is approximately three months (12 weeks).

Subtask 1.3 – Support to Acquire Well Permits

Subtask 1.4 – Riverside County Community Health Agency Department of Environmental Health Well Permit

The recharge basin site is located on private property. Western will arrange for property access. However, no permits are necessary for access to the property for testing work.

Monitoring well construction permits will be necessary from the RCCHA. The costs for this permit (one for each well) are shown in Table 1.

Task 2 – Design of Basin Facilities

Subtask 2.1 – Site Surveys

A land surface survey will be conducted at the Gibson recharge site. Vertical control shall be based on the North American Geodetic Vertical Datum of 1929 (NGVD29). Horizontal control shall be based on the California State Plane Coordinate system derived from the North American Datum of 1983 (NAD83).

Data from the surveys will be used to develop a field topographic of the area. Topography shall include obtaining locations, elevations and descriptions of:

- Natural ground slopes and grade breaks.
- Drainage channel grades at the Gibson site.
- Above ground street utilities including valves, pullboxes, meters, and vaults.
- Above ground features such as paths, trees and walks.

All field topography shall be collected electronically for data processing. Consultant shall data process all topography in AutoCAD LDD format. Line styles will be conventional. Text annotation will be stored in layers separate from the graphic elements. An AutoCAD file, layering, line style and color specification will be provided, if requested. The topographic map shall be drawn with one foot contours.

Subtask 2.2 – Pilot Recharge Basin Design

The pilot recharge basin will consist of an approximate 0.2-acre basin (90 ft x 90 ft) constructed below grade within the proposed site. The grading of the basin shall be coordinated with the existing drainage to ensure the ability to divert water within the channel during storm events. A grading plan shall be prepared at 1"=40' scale using the site survey data for the base mapping. The pilot basin will include inlet piping and structures to allow for the spreading of water during the pilot recharge test.

Subtask 2.3 – Temporary Water Supply and Conveyance Design

Potable water for the pilot recharge test will be obtained from a fire hydrant located adjacent to the site. Plans and specifications will be developed for temporary water source conveyance facilities (assumed for budgeting purposes to be approximately 1,000 linear feet of pipe, connecting to an existing fire hydrant). Pipeline plan and profile sheets will be prepared in 1" = 40' horizontal scale and 1" = 4' vertical scale.

Subtask 2.4 – Prepare Pilot Test Basin Construction Design Plans

Based on the preliminary design, a California Registered Civil Engineer will prepare a pilot system design technical memorandum, which will identify the facilities required to proceed with the pilot recharge testing plan. The technical memorandum will describe the proposed pilot system, including required facilities, design criteria, preliminary drawings (including: recharge basin site and grading plan, monitoring wells, and temporary water supply pipeline alignment).

The budget for this task assumes that one draft version of the technical memorandum will be submitted to Western (four hard copies with electronic files) for review and comment. Up to four copies of the final version will be prepared upon incorporation of comments and changes.

Task 3 - Basin Improvements and Construction

Subtask 3.1 – Pilot Recharge Basin Construction

A 0.2-acre Pilot recharge basin will be constructed on the Gibson site. Construction will include the pilot recharge basin, temporary water supply conveyance, and ancillary facilities. All construction work will be inspected in the field by a licensed Civil Engineer. The inspector will conduct weekly progress meetings with the contractor, prepare daily progress reports, maintain a submittal log, request for information (RFI) log, and contract change order log, coordinate construction inspection, monitor construction surveying and testing, review inspectors construction reports, monitor contractor schedules, monitor inspectors measurements and calculation sheets for each bid item of construction for progress payments, and revise monthly progress pay estimates for approval by the client.

Subtask 3.2 – Monitoring Well Drilling and Construction Support

The monitoring well construction process will be closely inspected to ensure it meets the requirements of California Department of Water Resources (CDWR) Bulletin 74-81 and 74-90 Well Standards. Well casing and filter pack will be inspected to ensure it meets the requirements of the final monitoring well design. During installation, onsite inspection will ensure that the well is constructed to the specified depths and with the specified screened intervals. Filter pack and seal installation will be inspected to ensure that the drilling contractor adheres to the depths and intervals specified.

Subtask 3.3 – Monitoring Well Construction

One monitoring well will be drilled at the Gibson site to measure changes in groundwater levels during the pilot recharge test at this location. The borehole for the well is assumed to be drilled to a depth of 100 ft bgs and completed as a 4-inch diameter PVC monitoring well. A planning-level contractor cost estimate to drill and construct the monitoring well, based on the hollow-stem auger drilling method, is included in Table 1. Soil samples will be collected every 10-ft during drilling and logged in the field in accordance with the USCS. All soil logging and well construction work will be conducted under the supervision of a California Registered Professional Geologist.

Well development would include initial development by bailing and swabbing and final development by pumping. During the well development process, a hydrogeologist will monitor groundwater quality parameters (electrical conductivity, pH, temperature and turbidity) and ensure that the discharge is relatively free and clear of suspended sediment prior to completion. Groundwater levels will be measured during all phases of well development to determine both static and pumping groundwater levels in the wells. All field activities will be recorded on established field forms for later reference.

Task 4 – Pre-Test Groundwater Monitoring

Prior to conducting the pilot test, the monitoring well will be equipped with a pressure transducer, which will enable continuous measurements of changes in groundwater levels beneath the Site before, during and after the pilot recharge test. In addition to data from the pressure transducers, manual measurements of groundwater levels will be taken in the monitoring well for a four week period prior to the pilot recharge test to establish the pre-test groundwater level condition.

Task 5 – Monitoring During One-Month Pilot Test

Upon completion of the pilot recharge basin, conveyance pipeline, and after four weeks of pre-test monitoring, water will be conveyed to the pilot basin in order to conduct the recharge test. Data will be collected during the test to establish surface water infiltration rates and groundwater level changes associated with artificial recharge. These data will be necessary for final basin design and to evaluate the amount of artificial recharge that the basin can accommodate. For planning purposes, the duration of the pilot recharge test is assumed to be one month.

Task 6 – Summary Report

WMWD will use the data gathered from the pilot percolation testing to prepare a report of the project. The report will summarize the findings of the testing and will include a description and technical drawings of the pilot recharge basin, water source and conveyance. The report will also summarize the data collected during the investigation, including basin inflow, infiltration rates, and groundwater levels.

The report will expand on the findings of the initial Site investigation and provide an assessment of the feasibility of artificial recharge at the Site, based on the data collected.